

# Motorola

# AUTO RADIO

MODEL  
**CTM4**

## S E R V I C E M A N U A L

### GENERAL INFORMATION

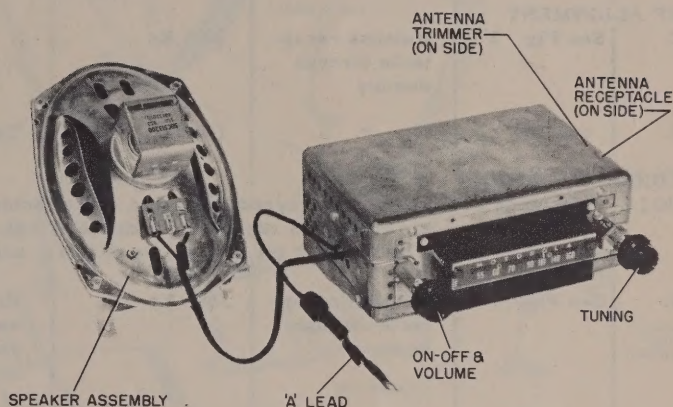
**TYPE** - The CTM4 is an automotive, single unit, manual tuning superheterodyne receiver with external speaker specifically designed for installation in 1954 Chevrolet cars.

**TUNING RANGE** - 540 to 1605 Kc      **IF** - 455 Kc

TUBE COMPLEMENT -	Type	Function
	6BD6	RF Amplifier
	6BE6	Converter
	6BD6	IF Amplifier
	6CR6	Det-AVC-AF Amp
	6AQ5	Power Amplifier
	6X4	Rectifier

**POWER INPUT** - 6.3 volts DC, 5 amperes

**POWER OUTPUT** - 3.5 watts (max)



### MOTOROLA AUTO RADIO WARRANTY SERVICE STATION PROCEDURE FOR BRANDED MODELS

1. The definition of a Motorola Branded Model is one that is branded with the Motorola name, and distributed to dealers through authorized Motorola Distributors.

2. Before performing a warranty repair on a Motorola Branded Auto Radio, you must first receive from the customer the Customer's Warranty Policy. This policy must be filled out by the selling dealer at the time of retail purchase. The Customer's Warranty Policy must show the radio to be within the ninety-day warranty period if the repair is to be handled under the Motorola Auto Radio Warranty Plan.

3. The removal or reinstallation of the radio, the elimination of motor noise, tire static, electrical interference, or faulty installation and aerial repairs are not considered as warranty repairs. Consequently, charges for these services are to be borne by the customer.

4. Fill in the Motorola Auto Radio Warranty Labor Claim, Part No. 54P480884, and mail White and Green copies to the Motorola Distributor serving your area. The Yellow copy is to be retained by the Warranty Service Station for his files.

5. Defective parts for warranty repairs made on Motorola Branded Auto Radios are to be sent to your Motorola Distributor for free replacement, supported with the defective parts return form which you are now using.

6. Only those service shops authorized by their Motorola Distributor can perform repairs within the warranty period on a no-charge basis to the customer. If you are not already authorized as a Motorola Auto Radio Warranty Service Station, and you are interested in handling this service, please contact your Motorola Distributor for complete details.

### ALIGNMENT

#### Equipment Required:

1. A small fibre screwdriver for IF and RF adjustments.
2. An accurately calibrated AM signal generator.
3. A low range output meter.
4. A dummy antenna for RF and tuner alignment (see Figure 3).
5. Core alignment tool (see Figure 2).

#### Procedure:

1. Remove top and bottom covers to expose alignment adjustments.
2. Connect speaker leads to speaker.
3. Connect output meter across voice coil of the speaker.
4. Connect a 6 volt DC source of power between "A" lead and receiver ground. Turn receiver on and set volume control at maximum clockwise position. Permit receiver to warm up for a few minutes.

LIST APPLICABLE BULLETINS & SUPPLEMENTS HERE:

MOTOROLA, INC. 4545 AUGUSTA BLVD. CHICAGO 51, ILLINOIS

Part No. 68P532223

Price 10 Cents

Printed in U.S.A.



NOTE:

To avoid overloading the receiver, keep output of receiver at 1 watt (1 watt = 1.79 volts on output meter) by reducing signal generator output (not receiver volume control) as stages are brought into alignment.

ALIGNMENT CHART

STEP	DUMMY ANTENNA	GENERATOR CONNECTION	GENERATOR FREQUENCY	TUNER SET TO	ADJUST SEE FIG. 1	REMARKS
IF ALIGNMENT						
1.	.1 mf	6BE6 grid (pin #7)	455 Kc	High frequency end of dial	1, 2, 3 & 4	Peak for maximum in order indicated
RF ALIGNMENT						
2.	See Fig. 3	Antenna receptacle through dummy	1605 Kc	"	5	Peak for maximum
3.	"	"	1400 Kc	Tune for max.	6 & 7	"
TUNER ALIGNMENT						
NOTE: The tuner cores have been correctly aligned at the factory. Field alignment of the tuner is not recommended unless components have been replaced or tampered with. Construct two core alignment tools as shown in Figure 2. Refer to Figure 2 for proper use of tools, and proceed to align as follows:						
4.	See Fig. 3	Antenna receptacle through dummy	1605 Kc	High frequency end of dial; cores should project 1-1/32" from end of coil form-screw out if necessary	5, 6 & 7	Peak for maximum in order indicated
5.	"	"	1400 Kc	1400 Kc-per Figure 1	8, 9 & 10	"
6.	With receiver installed in car, the antenna fully extended and dial set to approximately 1400 Kc, adjust antenna trimmer (7) for maximum signal of a weak station or noise between stations.					

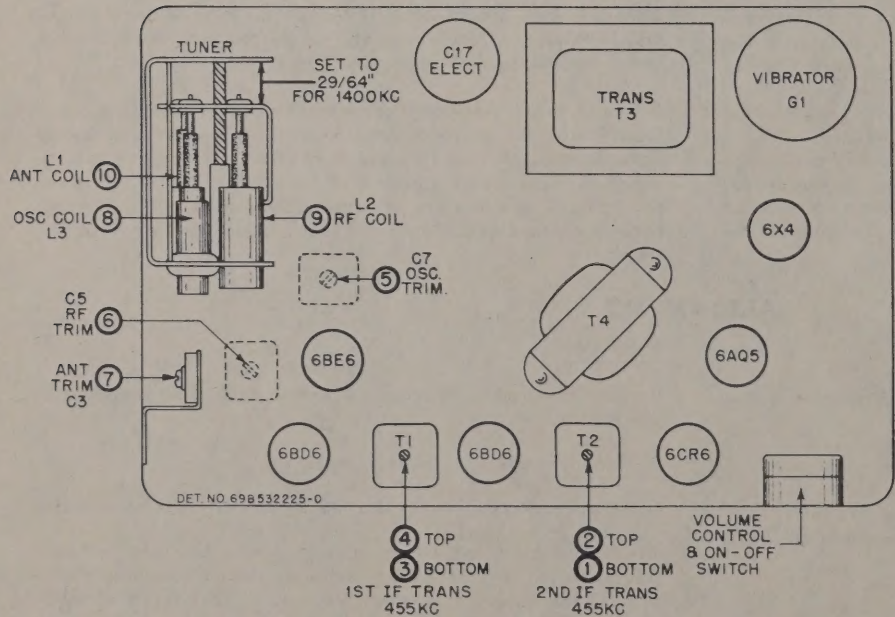


FIGURE 1. TUBE & TRIMMER LOCATIONS

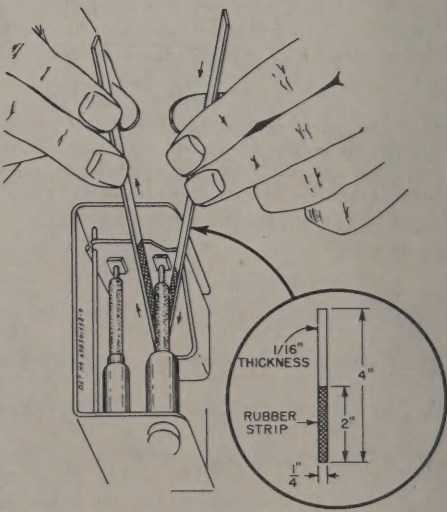


FIGURE 2. CORE ALIGNMENT



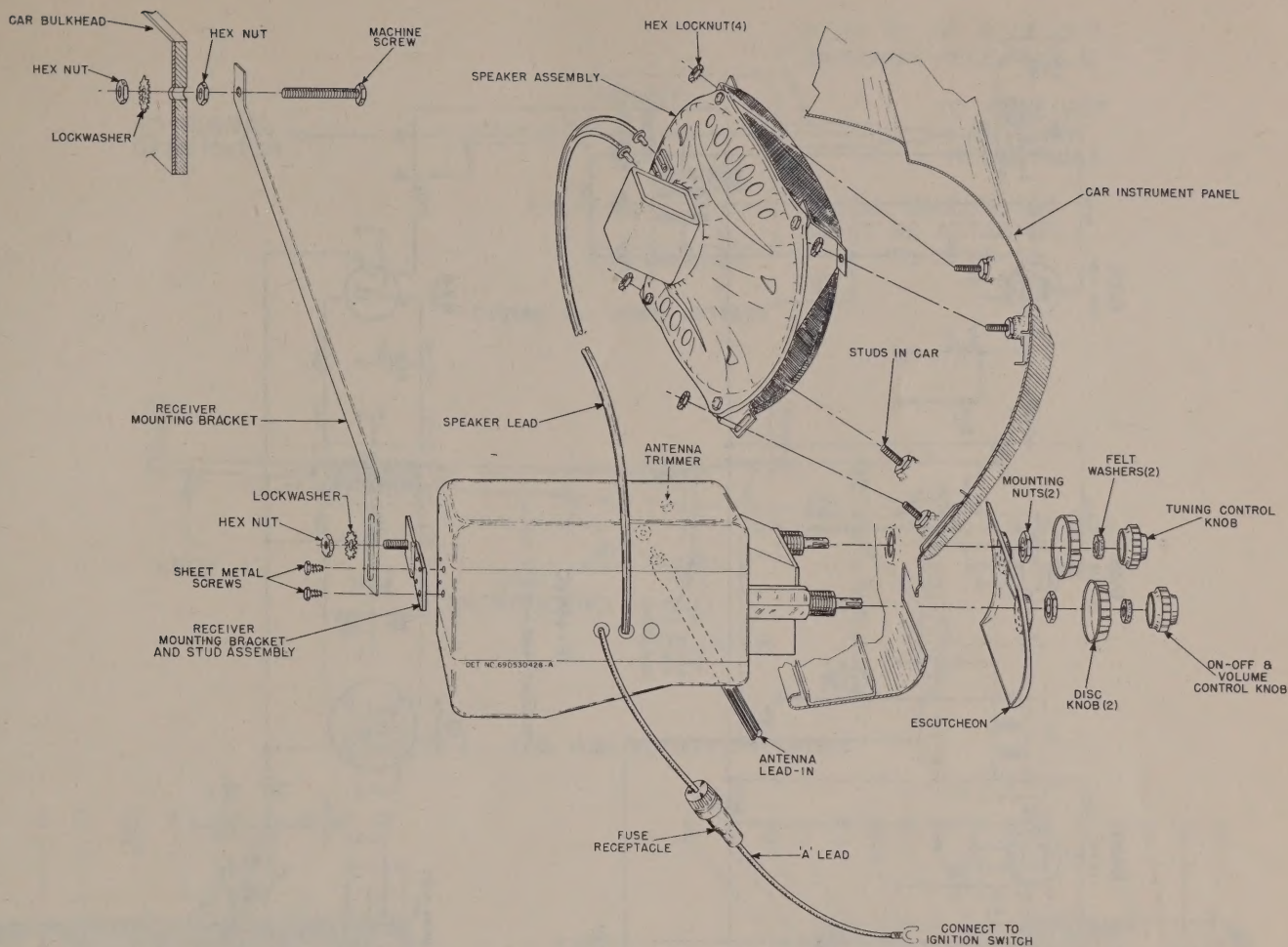


FIGURE 7. RECEIVER INSTALLATION

## REPLACEMENT PARTS LIST

NOTE: When ordering parts, specify model number of set in addition to part number and description of part.

Ref. No.	Part Number	Description	List Price	Ref. No.	Part Number	Description	List Price
<b>ELECTRICAL PARTS</b>							
C-1	21A591682	Cap, metal mica: 90 mmf....	.20	C-15	21R114554	Cap, ceramic disc: 470 mmf 500V.....	.20
C-2	8R121001	Cap, paper: .006 mf 400V..	.25	C-16	8R121572	Cap, paper: .03 mf 1000V...	.35
C-3	20A502338	Cap, mica trimmer: 50 to 280 mmf; with bracket.....	.45	C-17	23A485677	Cap, electrolytic: 10-15 mf/350V; 20 mf/25V...	2.25
C-4	21R115955	Cap, molded: 4.7 mmf 500V..	.20	C-18	8R121000	Cap, paper: .004 mf 600V...	.25
C-5	20A481526	Cap, variable mica: 20 to 180 mmf.....	.30	F-1	65K16248	Fuse: 9 amp.....	.05
C-6	21R115593	Cap, ceramic disc: 47 mmf 500V.....	.15	G-1	48B3333	Vibrator: 4-pin; non-sync..	3.80
C-7	20A485708	Cap, variable mica: 395 to 470 mmf.....	.55	I-1	65X10867	Bulb: 6.3V; .25A; bayonet base; #44.....	.15
C-8	8R121567	Cap, paper: .05 mf 400V....	.25	L-1	24B502472	Coil, antenna.....	2.00
C-9	8R121005	Cap, paper: .05 mf 200V....	.25	L-2	24B502473	Coil, RF.....	2.00
C-10	8K17028	Cap, paper: .5 mf 100V.....	.55	L-3	24B502474	Coil, oscillator.....	2.00
C-11	8R121002	Cap, paper: .01 mf 400V....	.20	L-4	24K580706	Choke, hash.....	.10
C-12	8K17028	Cap, paper: .5 mf 100V.....	.55	L-5	24A472535	Choke, hash.....	.40
C-13	8R121567	Cap, paper: .05 mf 400V....	.25				
C-14	8R121002	Cap, paper: .01 mf 400V....	.20				



## NOTE:

To avoid overloading the receiver, keep output of receiver at 1 watt (1 watt = 1.79 volts on output

meter) by reducing signal generator output (not receiver volume control) as stages are brought into alignment.

## ALIGNMENT CHART

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2.	See Fig. 3	Antenna receptacle through dummy	1605 Kc	"	5	Peak for maximum
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TUNER ALIGNMENT						
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5.	"	"	1400 Kc	1400 Kc-per Figure 1	8, 9 & 10	"

## TUNER ALIGNMENT

NOTE: The tuner cores have been correctly aligned at the factory. Field alignment of the tuner is not recommended unless components have been replaced or tampered with. Construct two core alignment tools as shown in Figure 2. Refer to Figure 2 for proper use of tools, and proceed to align as follows:

6. With receiver installed in car, the antenna fully extended and dial set to approximately 1400 Kc, adjust antenna trimmer (7) for maximum signal of a weak station or noise between stations.

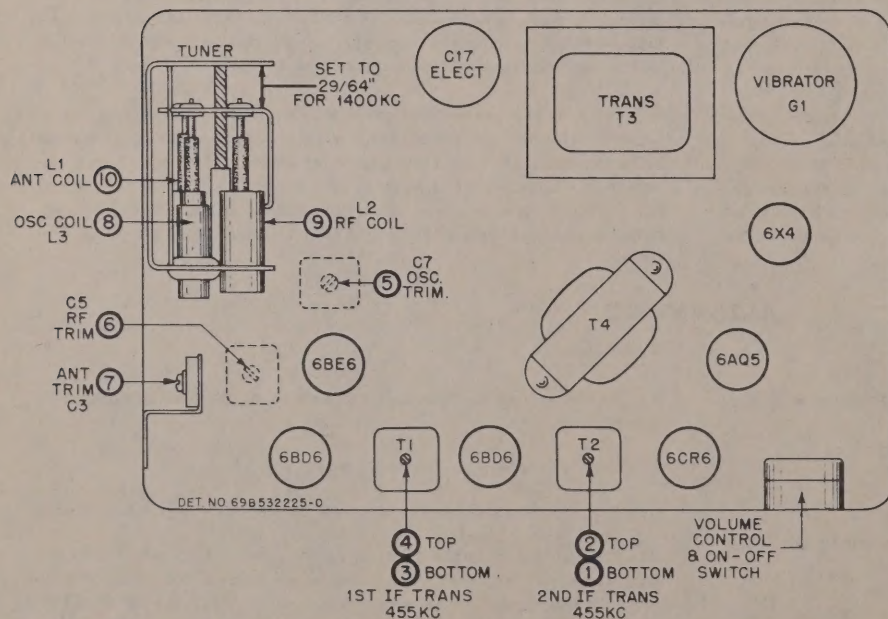


FIGURE 1. TUBE &amp; TRIMMER LOCATIONS

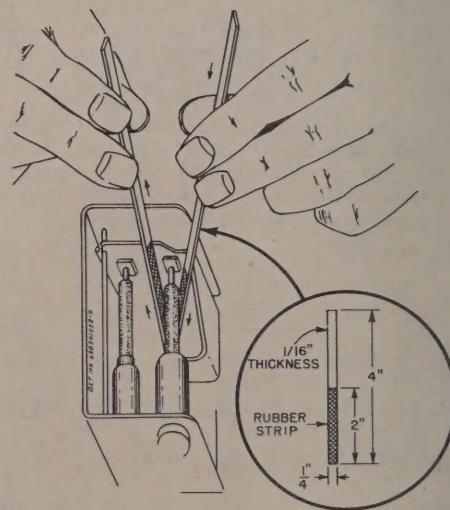


FIGURE 2. CORE ALIGNMENT



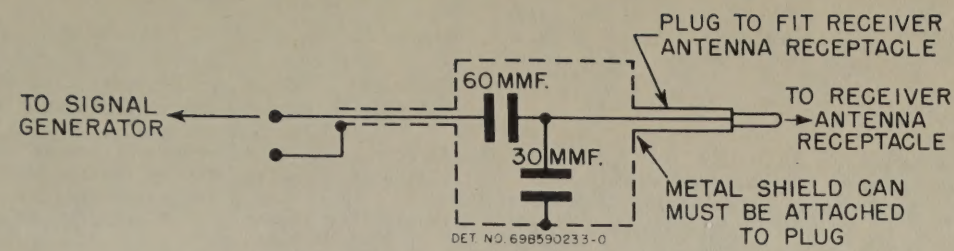


FIGURE 3. DUMMY ANTENNA

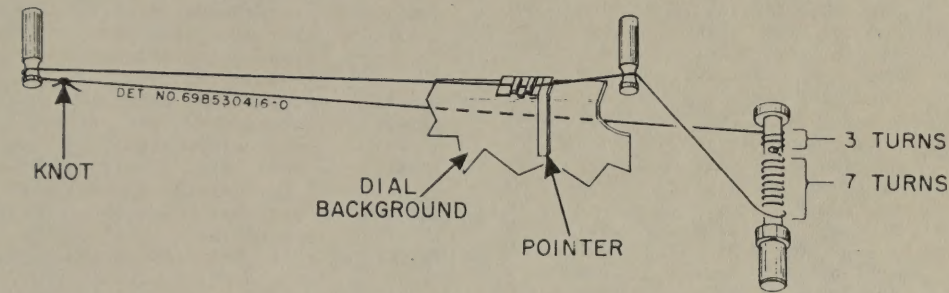


FIGURE 4. DIAL CORD RESTRINGING DETAIL

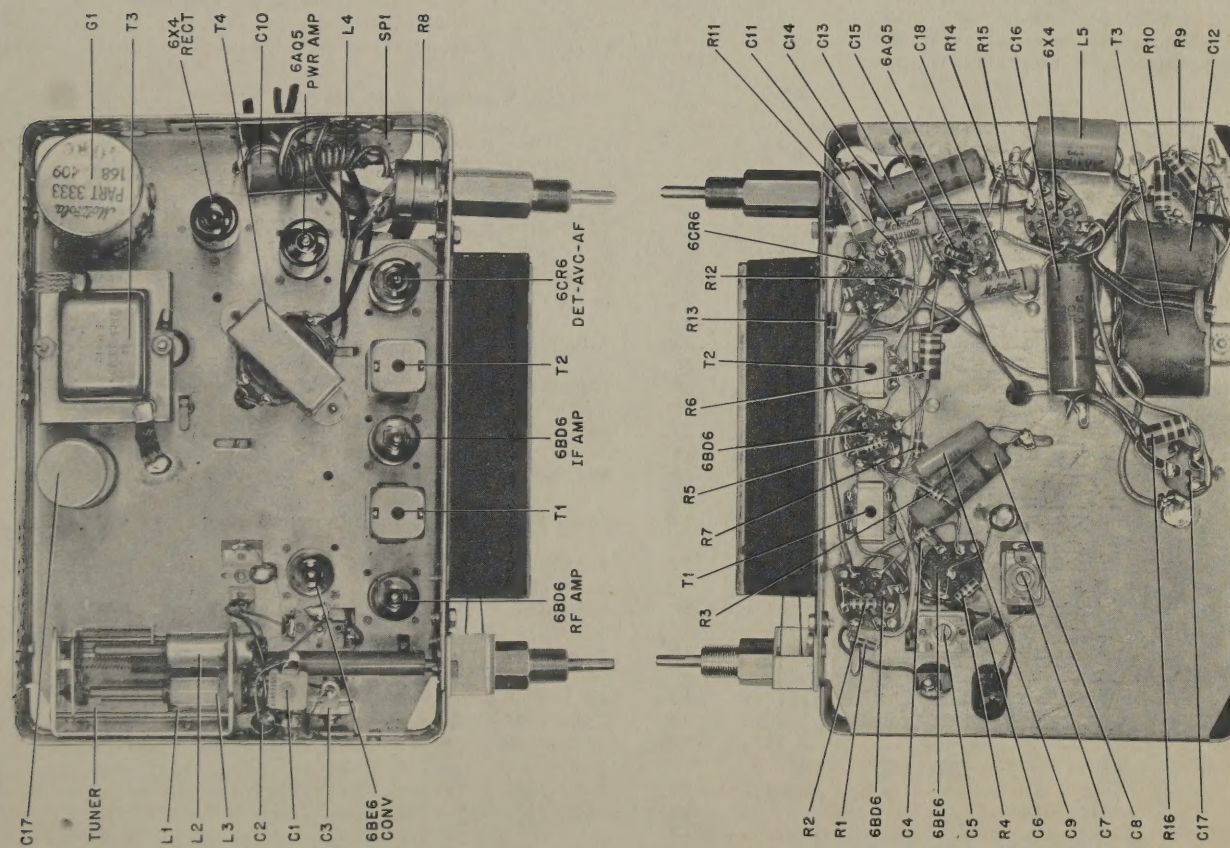


FIGURE 5. PARTS LOCATIONS

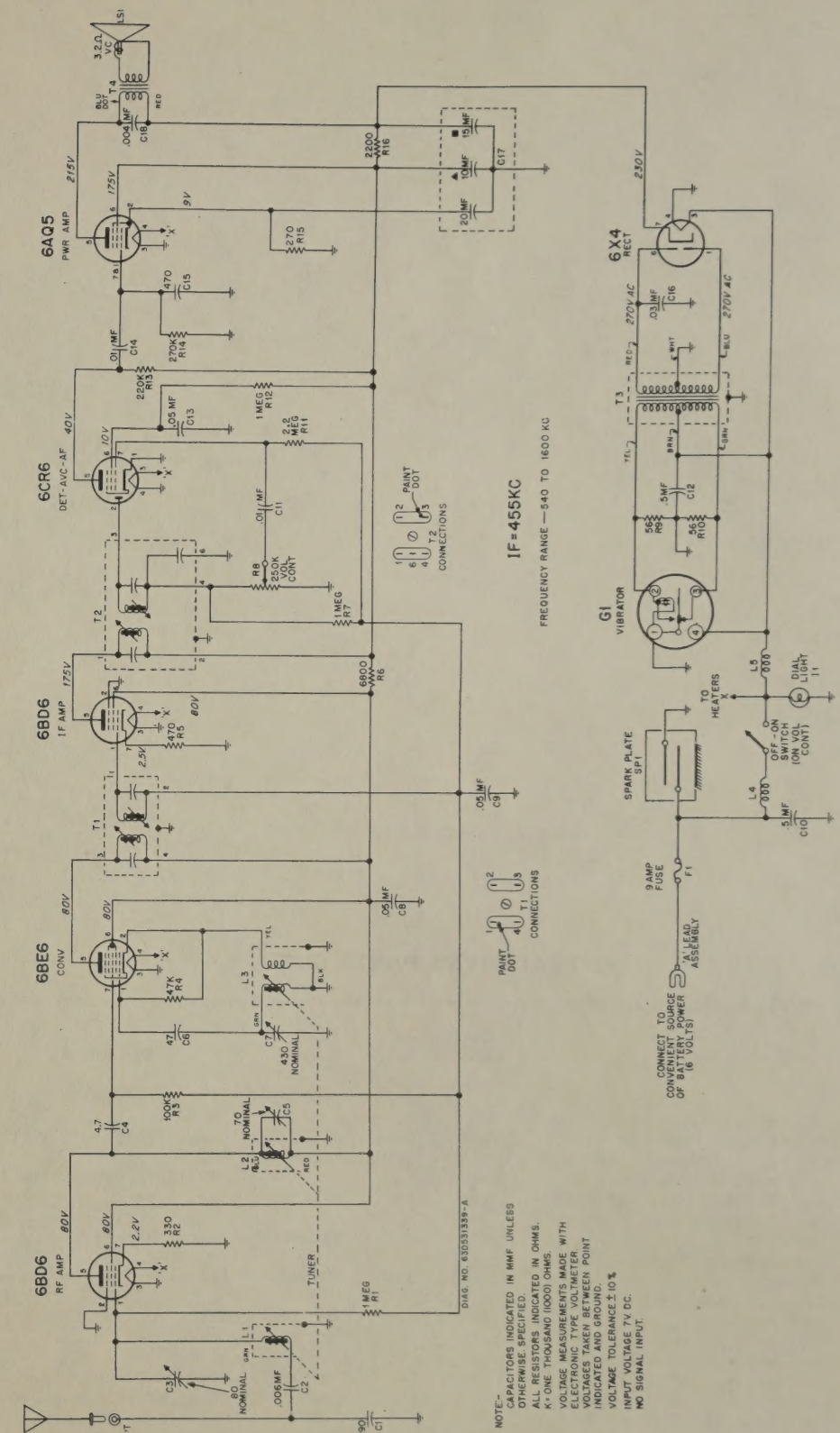


FIGURE 6. SCHEMATIC DIAGRAM



Ref. No.	Part Number	Description	List Price	Part Number	Description	List Price
LS-1	50C513193			9K592354	Socket, pilot light: with bracket	.20
or	50C513195			9R119819	Socket, tube: 7-pin; miniature; with dummy lug.....	.15
or	50C513197			9A70208	Socket, vibrator: 4-pin.....	.20
or	50C513200			41A485380	Spring, insert (tuning shaft coupling & control knobs).....doz	.15
or	50C513544	Speaker, PM: 6" x 9" oval; 3.2 ohm VC.....	8.95*	4K501364	Washer, "C" (tuning shaft retaining).....doz	.15
		exch	6.70	4K512467	Washer, felt: control knob....doz	.15
Resistors	Note:	All resistors are carbon insulated type unless otherwise specified.				
R-1	6R6004	1 meg 20% 1/2W.....doz	1.20	MOUNTING PARTS AND ACCESSORIES		
R-2	6R6022	330 10% 1/2W.....doz	1.20	13K530072	Escutcheon, dial.....	2.15
R-3	6R6075	100,000 20% 1/2W.....doz	1.20	1V532468	Kit, mounting parts and accessories: includes the items listed below.....	1.75
R-4	6R6056	47,000 20% 1/2W.....doz	1.20	8A4491	Capacitor, noise suppression.....	.85
R-5	6R6090	470 10% 1/2W.....doz	1.20	4S7688	Lockwasher: int-ext; 1/4 (receiver mtg).....doz	.15
R-6	6R5690	6800 10% 2W.....	.25	2S8397	Nut, hex: 1/2-28 x 5/8 (receiver to instrument panel mtg).....doz	.25
R-7	6R6004	1 meg 20% 1/2W.....doz	1.20	2S2878	Nut, hex: 1/4-20 x 7/16 (receiver mtg).....doz	.15
R-8	18B531559	Volume Control: 250K; includes on-off switch.....	1.15	2S115221	Nut, hex: 10-24 x 3/8 (spkr mtg to car).....doz	.30
R-9	6R2037	56 10% 1W.....	.20	3S7454	Screw, sheet metal: #8 x 1/4 (brkt and stud assembly mtg to receiver).....doz	.15
R-10	6R2037	56 10% 1W.....	.20	3S9694	Screw, machine: 1/4-20 x 1-1/2 hex head (brkt mtg to bulkhead).....doz	.50
R-11	6R3927	2.2 meg 20% 1/2W.....doz	1.20	6A4141	Suppressor, noise (distributor)...	.30
R-12	6R6004	1 meg 20% 1/2W.....doz	1.20	SPEAKER ASSEMBLY - MECHANICAL PARTS		
R-13	6R6015	220,000 20% 1/2W.....doz	1.20	7C530104	Bracket, speaker mtg (right-hand).	.30
R-14	6R6414	270,000 10% 1/2W.....doz	1.20	7K530107	Bracket, speaker mtg (left-hand)...	.30
R-15	6R6432	270 10% 1/2W.....doz	1.20	32C530122	Gasket & Screen Assembly, speaker.	1.30
R-16	6R476130	2200 20% 2W.....	.25	3S8188	Screw, sheet metal: #10 x 1/2 (mounts screen to spkr).....doz	.20
T-1	24C485553	1st IF, 455 Kc.....	1.45	TUNER (See Electrical Parts section for electrical parts)		
T-2	24K485554	2nd IF, 455 Kc.....	1.55	51D502490	Tuner, Model MT-87: complete.....	9.25*
T-3	25C501303	Power Transformer.....	4.45		exch	6.95
T-4	25B70171	Output Transformer.....	2.10	77D532163	Tuner, Model MT-127: complete.....	9.25*
					exch	6.95
Part Number	Description	List Price		43A502513	Bushing, stop: drive shaft (tuner MT-87).....	.05
MECHANICAL PARTS				43K512769	Bushing, stop: drive shaft (tuner MT-127).....	.05
9K530099	"A" Lead & Fuse Assembly: includes fuse.....	.80		42A502507	Clip, spring retainer (drive shaft mtg).....	.10
1V530165	Bracket & Bushing Assembly (tuning shaft tension).....	.30		46A502505	Core, iron (L-1,2 & 3 tuning).....	.35
7C530115	Bracket, dial scale mtg.....	.50		5A502510	Grommet (L-1 & 2 coil mtg).....doz	.15
7B530089	Bracket, dial background.....	.10		5A502516	Grommet (L-3 coil mtg).....	.05
43B530095	Bushing, mtg (vol. cont. shaft)...	.35		5A501013	Grommet (L-1,2 & 3 core mtg)....doz	.50
42B485548	Clip, coil can mtg (T-1 & 2)....doz	.35		2A502508	Nut, tension drive (on drive shaft).....	.05
42A500196	Clip, dial scale retaining.....doz	.30		47A502509	Shaft, manual drive.....	.45
42A4215	Clip, vibrator grounding.....	.10		26A502475	Shield, coil (L-1 & 2).....	1.25
58A501296	Coupling, tuning shaft: fibre....	.20		46A502506	Sleeve, iron (inside coil shield L-1 & 2).....	.35
15K501306	Cover, top (wiring side).....	1.80		4K502518	Washer, fibre (drive shaft mtg)doz	.15
15K530064	Cover, bottom (less speaker).....	1.90		4A502517	Washer, paper (L-1 & 2 coil mtg).....doz	.15
1V530175	Knob, control: with insert spring (tuning & volume).....	.20				
36B530118	Knob, disc (dummy knob - for tuning & vol. cont. shafts).....	.10				
4S7698	Lockwasher, int: 3/8" (volume control shaft mtg).....per/c	.50				
29A76280	Pin, terminal: with black insulator (spkr lead).....doz	.45				
29K76282	Pin, terminal: with white insulator (spkr lead).....doz	.45				
52A530111	Pointer and Slider Assembly.....	.20				
9A472148	Receptacle, antenna.....	.25				
5K501365	Rivet, shoulder (pointer cord guide).....	.05				
34B530121	Scale, dial.....	.25				
47B530098	Shaft, tuning.....	.15				

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

\*Plus Federal Excise Tax At Current Rate